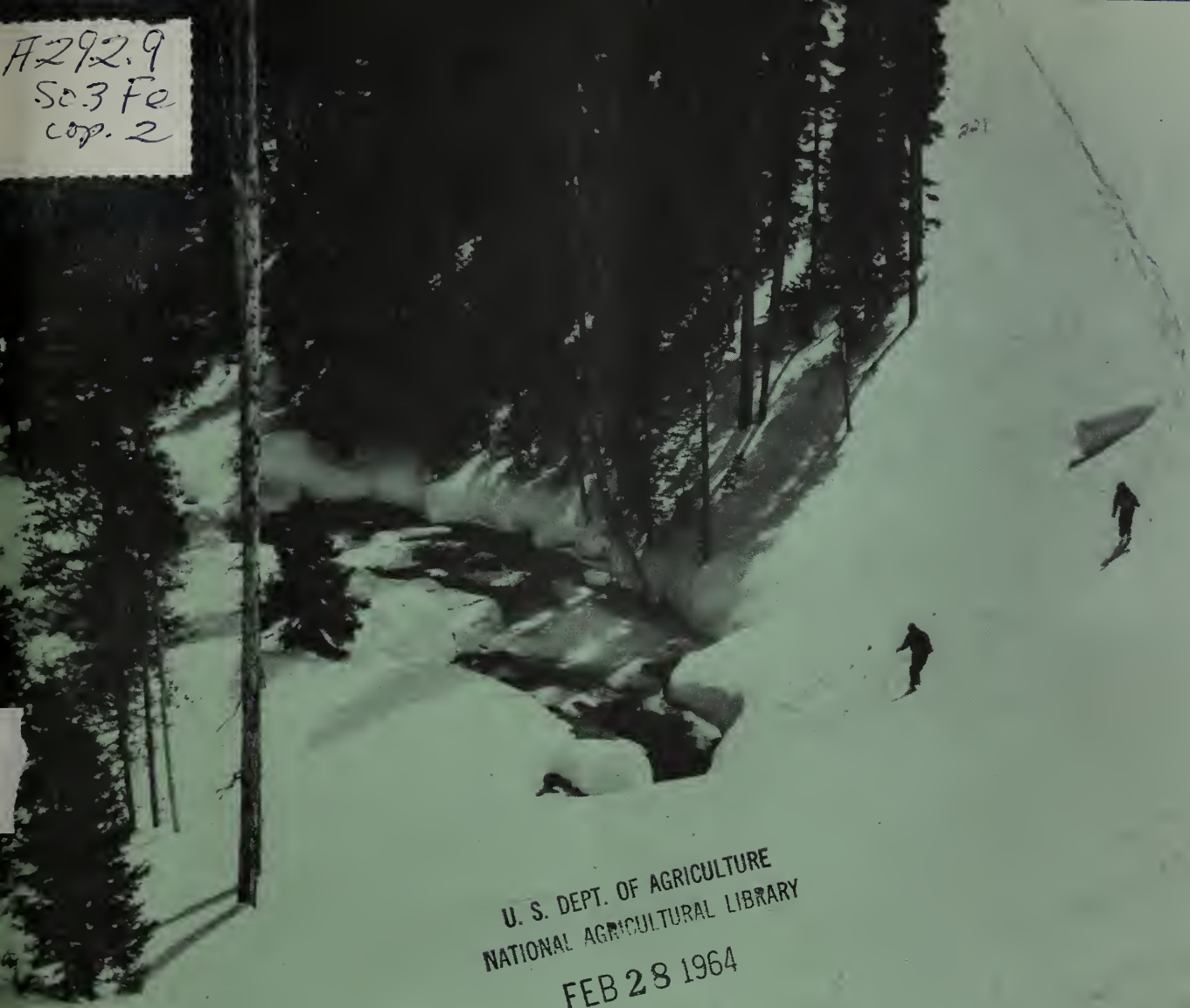


WATER SUPPLY OUTLOOK
and
FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS
for
WASHINGTON

UNITED STATES DEPARTMENT of AGRICULTURE···SOIL CONSERVATION SERVICE,
and
DEPARTMENT of CONSERVATION STATE of WASHINGTON

Data included in this report were obtained by the agencies named above in cooperation with the U.S. Forest Service, U.S. Geological Survey, National Park Service, and other Federal, State and private organizations.

AS OF
APR. 1, 1963

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

To Recipients of Water Supply Outlook Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from advance estimates of the streamflow.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, up to 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

Streamflow forecasts are obtained by a comparison of total or maximum snow accumulation, as measured by snow water equivalent, to the subsequent spring and summer or snowmelt season runoff over a period of years. The snow water equivalent measured in selected snow courses provides most of the index to the streamflow forecast for the following season. More accurate forecasts are usually obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast procedure. Early season forecasts assume average climatic conditions through the snowmelt season.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions. Soil Conservation Service Reports may be secured from Water Supply Forecasting Unit, Soil Conservation Service, P.O. Box 4170, Portland 8, Oregon.

PUBLISHED BY SOIL CONSERVATION SERVICE

REPORTS	ISSUED	LOCATION	COOPERATING WITH
RIVER BASINS			
Western United States	Monthly (Feb.-May)	Portland, Oregon	All Cooperators
STATES			
Alaska	Monthly (Mar.-May)	Palmer, Alaska	Alaska S.C.D.
Arizona	Semi-Monthly (Jan.15 - Apr.1)	Phoenix, Arizona	Salt R. Valley Water Users Assoc. Ariz. Agr. Exp. Station
Colorado and New Mexico	Monthly (Feb.-May)	Fort Collins, Colorado	Colo. State University Colo. State Engineer N. Mex. State Engineer
Idaho	Monthly (Jan.-June)	Boise, Idaho	Idaho State Reclamation Engineer
Montana	Monthly (Jan.-June)	Bozeman, Montana	Mont. Agr. Exp. Station
Nevada	Monthly (Jan.-May)	Reno, Nevada	Nevada Dept. of Conservation and Natural Resources - Division of Water Resources
Oregon	Monthly (Jan.-June)	Portland, Oregon	Oreg. State University Oregon State Engineer
Utah	Monthly (Jan.-June)	Salt Lake City, Utah	Utah State Engineer
Washington	Monthly (Feb.-June)	Spokane, Washington	Wn. State Dept. of Conservation
Wyoming	Monthly (Feb.-June)	Casper, Wyoming	Wyoming State Engineer

PUBLISHED BY OTHER AGENCIES

REPORTS	ISSUED	AGENCY
British Columbia	Monthly (Feb.-June)	Water Rights Br., Dept. of Lands, Forests and Natural Resources, Parliament Blog., Victoria, B.C., Canada
California	Monthly (Feb.-May)	Calif. Dept. of Water Resources, P.O. Box 388, Sacramento, Calif.

FEDERAL-STATE-COOPERATIVE

SNOW SURVEY AND WATER SUPPLY FORECASTS

For

WASHINGTON

Report Prepared
By

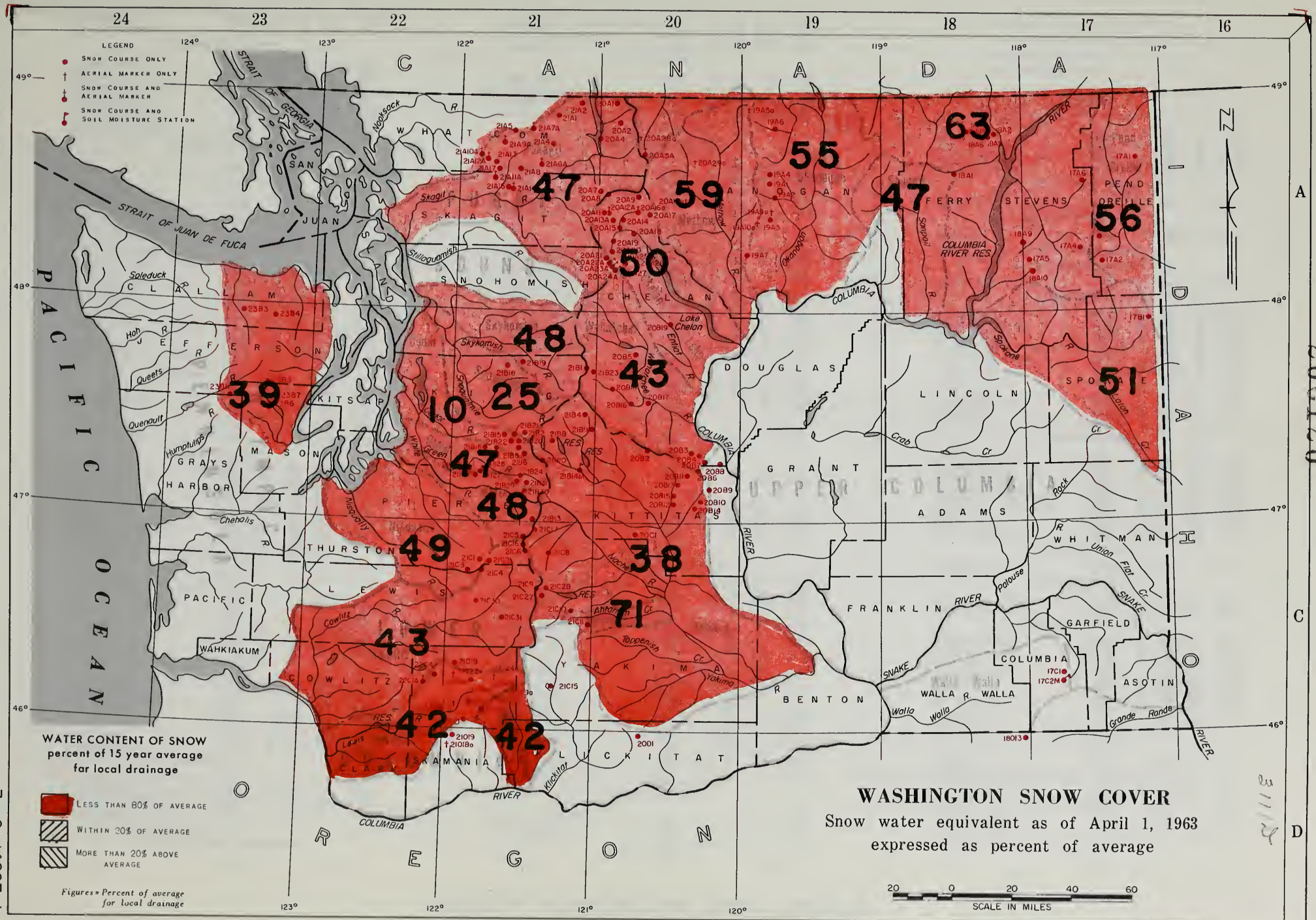
Robert T. Davis, Snow Survey Supervisor

Soil Conservation Service
840 Bon Marche Building
Spokane, Washington

Issued By

Orlo W. Krauter
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture

Murray G. Walker, Supervisor
Division of Water Resources
Department of Conservation
State of Washington



U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE

7-0-14887-L

20613120

INDEX to WASHINGTON SNOW COURSES

NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.
UPPER COLUMBIA DRAINAGE					
Pend Oreille River					
Boyer Mountain	17A2	7	31N	43E	5250
Bunchgrass Meadow	17A1	24	37N	44E	5000
Mt. Spokane	17H1	15	28N	45E	4650
Winchester Creek	17A3	30	33N	43E	2970
Kettle River					
Boulder Road	18A2	36	39N	36E	1450
Butte Creek	18A3	28	39N	35E	4070
Cabin Creek	18A8	5	38N	36E	3170
Goat Creek	19A4	26	39N	35E	3595
Snow Caps Creek	18A5	3	39N	36E	2150
Snow Caps Trail	18A6	5	38N	36E	2720
Summit G. S.	18A7	20	39N	35E	4600
Colville River					
Baird	17A6	19	36N	42E	3215
Carlson	18A9	34	32N	38E	2885
Chewelah	17A4	11	32N	41E	4925
Stranger Mountain	17A5	26	31N	38E	4990
Togo	18A10	6	29N	38E	3370
Sanpoil River					
Sherman Creek Pass	18A1	19	36N	35E	5350
Okanogon River					
Muckamuck	19A9a	20	36N	24E	
Mutton Creek No. 1	19A1	30	37N	24E	5700
Mutton Creek No. 2	19A4	19	37N	24E	6000
Paysayten	20A28a	32	40N	18E	4300
Rusty Creek	19A3	18	35N	24E	4000
Salmon Meadows	19A2	33	37N	24E	4500
Starvation Mtn.	19A10a	15	35N	23E	6750
Touts Coulee	19A6	30	39N	25E	2845
Methow River					
Billy Goat Pass	20A10a	10	38N	20E	6400
Dollar Watch	20A29a	8	39N	20E	7000
Harts Pass	20A5A	7	37N	18E	6500
Horseshoe Basin	19A5a	15	40N	23E	7000
Loup Loup	19A7	36	34N	23E	4650
Chelan Lake Basin					
Agnes Creek	20A21	1	31N	15E	5400
Bridge Creek	20A15	20	34N	16E	2100
Bullion	20A18	2	33N	16E	1460
Cloudy Pass	20A22A	12	31N	15E	6500
Cottonwood	20A11	10	34N	14E	2500
Dagger Lake	20A17	6	34N	18E	5200
Greenwood Flat	20A25A	3	31N	16E	3540
Little Meadows	20A24A	8	31N	16E	5275
Lyman Lake	20A23A	18	31N	16E	5900
Park Creek Flat	20A13A	18	34N	16E	2220
Park Creek Ridge	20A12A	7	34N	16E	4600
Pass Creek	20A19	30	33N	16E	2500
Petersons	20A16a	3	34N	17E	3730
Rainy Pass	20A9	21	35N	17E	4780
Seven Mile	20A26	14	31N	17E	3015
Two Mile	20A27	16	31N	18E	2020
Entiat River					
Brief	20B19	34	28N	19E	1600
Wenatchee River					
Berne-Mill Creek	21B23	7	26N	15E	2925
Blewett Pass No. 2	20B2	35	22N	17E	4270
Chiwaukum G. S.	20B16	4	25N	17E	1810
Lake Wenatchee	20B5	33	27N	17E	1970
Leavenworth R. S.	20B17	1	24N	17E	1127
Merritt	20B18	4	26N	16E	2140
Stevens Pass	21B1	14	26N	13E	4070
Squilchuck Creek					
Beehive Springs	20B3	12	21N	19E	4400
Scout-A-Vista	20B4	18	21N	20E	3400

NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.
Stemilt Creek					
Jump-Off	20B5	26	21N	20E	4450
Stemilt Slide	20B6	30	21N	20E	5000
Upper Wheeler	20B7	30	21N	20E	4400
Yakima River					
Ahtanum R. S.	21C11	26	12N	14E	3100
Big Boulder Creek	21B9	35	23N	14E	3200
Bumping Lake	21C8	23	16N	12E	3450
Clockum Pass	20B9	25	20N	20E	5370
Cooke Creek	20B10	17	19N	20E	4123
Fish Lake	21B4	34	24N	14E	3371
Green Lake	21C10	3	12N	13E	6000
Grouse Camp	20B11	29	21N	19E	5385
High Creek	20B12	34	19N	20E	2930
Lake Cle Elum	21B14M	15	20N	14E	2200
Manashtash	20C1	24	17N	16E	3935
Morse Lake	21C17	6	16N	11E	5400
Nanum	20B13	4	20N	19E	3875
Trail Creek	20B14	20	19N	20E	3360
Tunnel Avenue	21B8	13	21N	11E	2450
Walters Flat	20B15	22	20N	19E	3360
White Pass	21C9	2	13N	11E	4500
White Pass (East Side)	21C28	2	13N	11E	4500
White Pass (Leach Lake)	21C27	1	13N	11E	4500
LOWER COLUMBIA DRAINAGE					
Mill Creek					
Homestead	17C1	11	9N	40E	4030
Martin Springs	17C2M	23	9N	40E	4400
Walla Walla Diversion	18D13	22	6N	38E	2400
Klickitat River					
Satus Pass	20D1	21	6N	17E	4030
West Fork Cabin	21C15	23	9N	12E	3000
White Salmon River					
Cultus Creek	21C12	35	7N	8E	4000
Lewis River					
Blue Lake	21C22a	19	9N	8E	4800
Bob's Trail	21C21	25	8N	7E	2200
Calamity Ridge	22D1a	8	5N	5E	2500
Council Pass	21C18a	24	9N	9E	4200
Divide Meadow	21C29a	21	9N	10E	5600
Grand Meadow	21C25	28	8N	9E	3500
Lone Pine Shelter	21C26	8	9N	7E	3800
Muddy River	22C3	26	8N	6E	1400
Oldman Pass	21D19	22	6N	7E	3100
Plains of Abraham	22C1A	35	9N	5E	4400
Smith Creek Road	22C4	29	9N	6E	2100
Spencer Meadow	21C20a	16	8N	7E	3400
Surprise Lakes	21C13A	14	7N	8E	4250
Table Mountain	21C24a	20	9N	9E	4200
Timbered Peak	21D18a	36	6N	6E	3000
Cowlitz River					
Cayuse Pass	21C6	15	16N	10E	5300
Mosquito Meadows	21C19	33	10N	7E	4100
Packwood Lake	21C31	21	13N	10E	2870
Potato Hill	21C14	36	10N	10E	4500
Willame Creek	21C30	3	13N	8E	3250
PUGET SOUND DRAINAGE					
Nisqually River					
Ghost Forest	21C4	23	15N	8E	4550
Longmire	21C3	29	15N	8E	2760
Paradise Park	21C2	13	15N	8E	5500
Stem Glade	21C1	13	15N	8E	5050
White River					
Corral Pass	21B13	30	18N	11E	6000
White River Entrance	21C5	4	16N	10E	3600
White River Entrance (New)	21C16	4	16N	10E	3400

NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.
Green River					
Airstrip	21B24	14	20N	11E	1800
Charley Creek	21B25	27	21N	8E	1200
Grass Mountain No. 1	21B26	21	20N	8E	4000
Grass Mountain No. 2	21B27	14	20N	8E	2900
Grass Mountain No. 3	21B28	12	20N	8E	2100
Lester Creek	21B29	36	20N	10E	3100
Sawmill Ridge	21B31	5	19N	11E	4700
Stampede Pass	21B10	25	21N	11E	3000
Twin Camp	21B30	18	19N	11E	4100
Cedar River					
City Cabin	21B3	10	21N	10E	2390
Mt. Gardner	21B21	30	22N	10E	3300
Mt. Gardner Aux.	21B22	31	22N	10E	2500
Mt. Lindsay	21B16	31	22N	9E	2500
Mt. Washington	21B15	8	22N	9E	3000
Rex River	21B17	11	21N	9E	2400
South Fork Cedar	21B6	24	21N	10E	3000
Tinkham Creek	21B20	1	21N	10E	3400
Snoqualmie River					
Olallie Meadows	21B2	19	22N	11E	3625
South Fork Tolt	21B18	26	26N	9E	1900
Skykomish River					
Lake Elizabeth	21B19	33	26N	10E	2900
Skagit River					
Beaver Creek Trail	21A4	35	39N	12E	2200
Beaver Pass	21A1	9	39N	12E	3680
Devils Park	20A4	34	38N	16E	5900
Freezeout Creek Trail	20A1	14	40N	14E	3500
Freezeout Meadows	20A2	8	40N	16E	5000
Lake Hozomeen	21A2	19	40N	14E	2600
Meadow Cabins	20A8	29	36N	14E	1900
Thunder Basin	20A7	15	35N	14E	4200
Baker River					
Dock Butte	21A11A	8	36N	8E	3800
Easy Pass	21A7A	19	39N	11E	5200
Jasper Pass	21A6A	17	38N	11E	5400
Koma Kulshan	21A17	31	37N	9E	800
Marten Lake	21A9A	23	38N	8E	3600
Rocky Creek	21A12A	20	37N	8E	2100
Schreibers Meadow	21A10A	18	37N	8E	3400
S. F. Thunder Creek	21A14A	20	36N	9E	2200
Sulphur Creek	21A13	22	37N	8E	1600
Three Mile Creek	21A15	18	36N	9E	1600
Watson Lakes	21A8	25	37N	9E	4500
Nooksack River					
Panorama	21A5	17	39N	9E	4300
OLYMPIC PENINSULA					
Dungeness River					
Deer Park	23B4	1	28N	5W	5200
Elwha River					
Hurricane	23B3	36	29N	7W	4500
Skokomish River					
Black and White	23B7	17	24N	5W	4200
Black and White Lakes	23B6	16	24N	5W	4700
Home Sweet Home	23B5	28	25N	5W	5200
Sundown Pass	23B8	25	24N	7W	3900

LEGEND

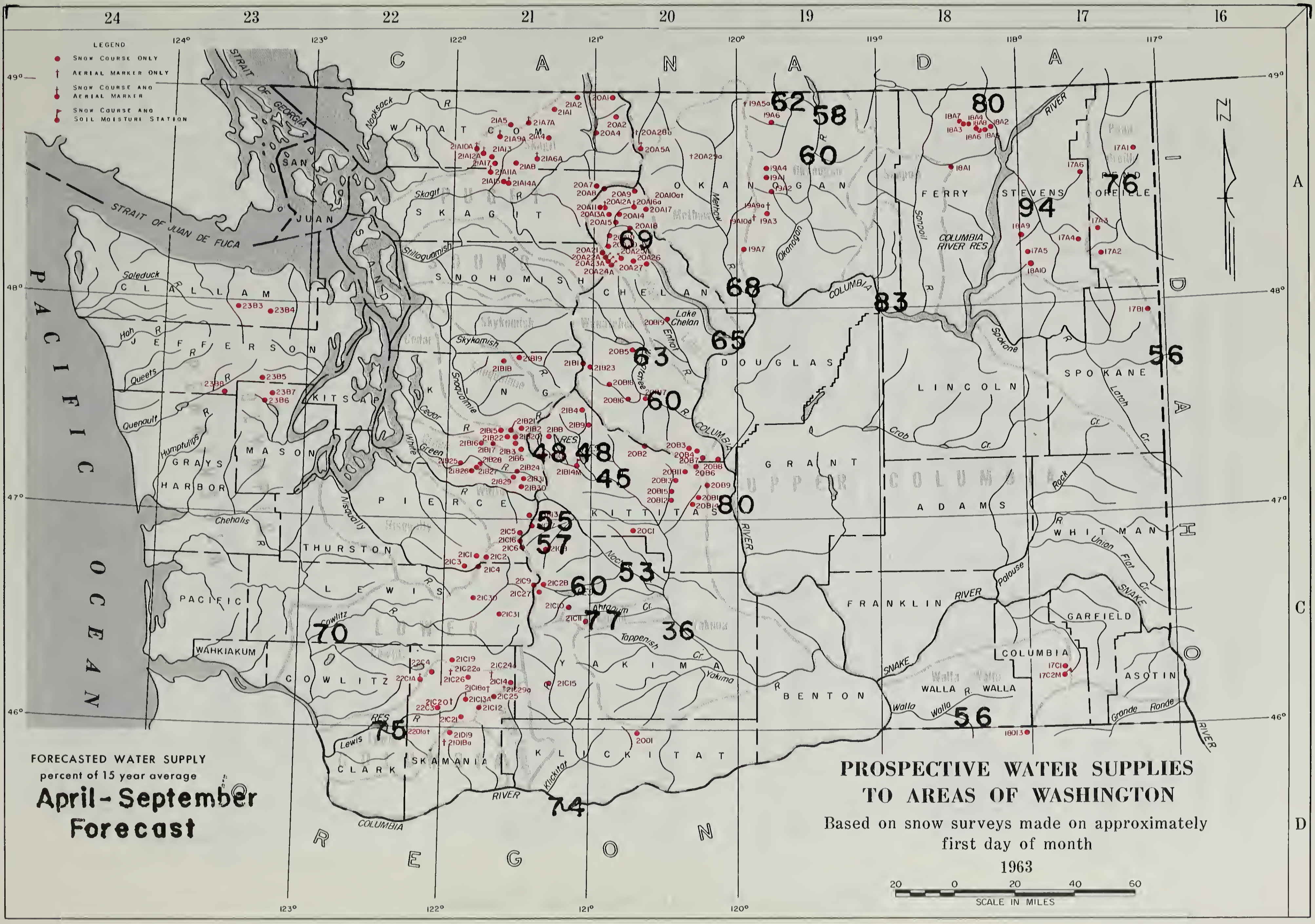
NUMBERING SYSTEM EXAMPLE

21A7 SNOW COURSE ONLY

21A7a AERIAL MARKER ONLY

21A7A SNOW COURSE AND AERIAL MARKER

21A7M SNOW COURSE AND SOIL MOISTURE STATION



U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE M-929

7-0-14887-L

INDEX to WASHINGTON SNOW COURSES

NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.
UPPER COLUMBIA DRAINAGE					
Pend Oreille River					
Boyer Mountain	17A2	7	31N	43E	5250
Bunchgrass Meadow	17A1	24	37N	44E	5000
Mt. Spokane	17B1	15	28N	45E	4650
Winchester Creek	17A3	30	33N	43E	2970
Kettle River					
Boulder Road	18A2	36	39N	36E	1450
Butte Creek	18A3	28	39N	35E	4070
Cabin Creek	18A8	5	38N	36E	3170
Goat Creek	18A4	26	39N	35E	3595
Snow Caps Creek	18A5	3	38N	36E	2150
Snow Caps Trail	18A6	5	38N	36E	2720
Summit G. S.	18A7	20	39N	35E	4600
Colville River					
Baird	17A6	19	36N	42E	3215
Carlson	18A9	34	32N	38E	2885
Chewelah	17A4	11	32N	41E	4925
Stranger Mountain	17A5	26	31N	38E	4990
Togo	18A10	6	29N	38E	3370
Sonpoil River					
Sherman Creek Pass	19A1	19	36N	35E	5350
Okanogan River					
Muckamuck	19A9a	20	36N	24E	
Mutton Creek No. 1	19A1	30	37N	24E	5700
Mutton Creek No. 2	19A4	19	37N	24E	6000
Paysayten	20A28a	32	40N	18E	4300
Rusty Creek	19A3	18	35N	24E	4000
Salmon Meadows	19A2	33	37N	24E	4500
Starvation Mtn.	19A10a	15	35N	23E	6750
Touts Coulee	19A6	30	39N	25E	2845
Methow River					
Billy Goat Pass	20A10a	10	38N	20E	6400
Dollar Watch	20A29a	8	39N	20E	7000
Harts Pass	20A5A	7	37N	18E	6500
Horseshoe Basin	19A5a	15	40N	23E	7000
Loup Loup	19A7	36	34N	23E	4650
Chelan Lake Basin					
Agnes Creek	20A21	1	31N	15E	5400
Bridge Creek	20A15	20	34N	16E	2100
Bullion	20A18	2	33N	16E	1460
Cloudy Pass	20A22A	12	31N	15E	6500
Cottonwood	20A11	10	34N	14E	2500
Dagger Lake	20A17	6	34N	18E	5200
Greenwood Flat	20A25A	3	31N	16E	3540
Little Meadows	20A24A	8	31N	16E	5275
Lyman Lake	20A23A	18	31N	16E	5900
Park Creek Flat	20A13A	18	34N	16E	2220
Park Creek Ridge	20A12A	7	34N	16E	4600
Pass Creek	20A19	30	33N	16E	2500
Petersons	20A16a	3	34N	17E	3730
Rainy Pass	20A9	21	35N	17E	4780
Seven Mile	20A26	14	31N	17E	3015
Two Mile	20A27	16	31N	18E	2020
Entiat River					
Brief	20E19	34	28N	19E	1600
Wenatchee River					
Berne-Mill Creek	21B23	7	26N	15E	2925
Blewett Pass No. 2	20B2	35	22N	17E	4270
Chiwaukum G. S.	20B16	4	25N	17E	1810
Lake Wenatchee	20B5	33	27N	17E	1970
Leavenworth R. S.	20B17	1	24N	17E	1127
Merritt	20B18	4	26N	16E	2140
Stevens Pass	21B1	14	26N	13E	4070
Squilchuck Creek					
Beehive Springs	20B3	12	21N	19E	4400
Scout-A-Vista	20B4	18	21N	20E	3400
Stemilt Creek					
Jump-Off	20B8	26	21N	20E	4450
Stemilt Slide	20B6	30	21N	20E	5000
Upper Wheeler	20B7	30	21N	20E	4400
Yakima River					
Ahtanum R. S.	21C11	26	12N	14E	3100
Big Boulder Creek	21B9	35	23N	14E	3200
Bumping Lake	21C8	23	16N	12E	3450
Clockum Pass	20B9	25	20N	20E	5370
Cooke Creek	20B10	17	19N	20E	4123
Fish Lake	21B4	34	24N	14E	3371
Green Lake	21C10	3	12N	13E	6000
Grouse Camp	20B11	29	21N	19E	5385
High Creek	20B12	34	19N	20E	2930
Lake Cle Elum	21B14M	15	20N	14E	2200
Manashtash	20C1	24	17N	16E	3935
Morse Lake	21C17	6	16N	11E	5400
Nanum	20B13	4	20N	19E	3875
Trail Creek	20B14	20	19N	20E	3360
Tunnel Avenue	21B8	13	21N	11E	2450
Walters Flat	20B15	22	20N	19E	3360
White Pass	21C9	2	13N	11E	4500
White Pass (East Side)	21C28	2	13N	11E	4500
White Pass (Leach Lake)	21C27	1	13N	11E	4500
LOWER COLUMBIA DRAINAGE					
Mill Creek					
Homestead	17C1	11	9N	40E	4030
Martin Springs	17C2M	23	9N	40E	4400
Walla Walla Diversion	18D13	22	6N	38E	2400
Kliekitat River					
Satus Pass	20D1	21	6N	17E	4030
West Fork Cabin	21C15	23	9N	12E	3000
White Salmon River					
Cultus Creek	21C12	35	7N	8E	4000
Lewis River					
Blue Lake	21C22a	19	9N	8E	4800
Bob's Trail	21C21	25	8N	7E	2200
Calamity Ridge	22D1a	8	5N	5E	2500
Council Pass	21C18a	24	9N	9E	4200
Divide Meadow	21C29a	21	9N	10E	5600
Grand Meadow	21C25	28	8N	9E	3500
Lone Pine Shelter	21C26	8	9N	7E	3800
Muddy River	22C3	26	8N	6E	1400
Oldman Pass	21D19	22	6N	7E	3100
Plains of Abraham	22C1A	35	9N	5E	4400
Smith Creek Road	22C4	29	9N	6E	2100
Spencer Meadow	21C20a	16	8N	7E	3400
Surprise Lakes	21C13A	14	7N	8E	4250
Table Mountain	21C24a	20	9N	9E	4200
Timbered Peak	21D18a	36	6N	6E	3000
Cowlitz River					
Cayuse Pass	21C6	15	16N	10E	5300
Mosquito Meadows	21C19	33	10N	7E	4100
Packwood Lake	21C31	21	13N	10E	2870
Potato Hill	21C14	36	10N	10E	4500
Willame Creek	21C30	3	13N	8E	3250
PUGET SOUND DRAINAGE					
Nisqually River					
Ghost Forest	21C4	23	15N	8E	4550
Longmire	21C3	29	15N	8E	2760
Paradise Park	21C2	13	15N	8E	5500
Stem Glade	21C1	13	15N	8E	5050
White River					
Corral Pass	21B13	30	18N	11E	6000
White River Entrance	21C5	4	16N	10E	3600
White River Entrance (New)	21C16	4	16N	10E	3400
Green River					
Airstrip	21B24	14	20N	11E	1800
Charley Creek	21B25	27	21N	8E	1200
Grass Mountain No. 1	21B26	21	20N	8E	4000
Grass Mountain No. 2	21B27	14	20N	8E	2900
Grass Mountain No. 3	21B28	12	20N	8E	2100
Lester Creek	21B29	36	20N	10E	3100
Sawmill Ridge	21B31	5	19N	11E	4700
Stampede Pass	21B10	25	21N	11E	3000
Twin Camp	21B30	18	19N	11E	4100
Cedar River					
City Cabin	21B3	10	21N	10E	2390
Mt. Gardner	21B21	30	22N	10E	3300
Mt. Gardner Aux.	21B22	31	22N	10E	2500
Mt. Lindsay	21B16	31	22N	9E	2500
Mt. Washington	21B15	8	22N	9E	3000
Rex River	21B17	11	21N	9E	2400
South Fork Cedar	21B6	24	21N	10E	3000
Tinkham Creek	21B20	1	21N	10E	3400
Snoqualmie River					
Olallie Meadows	21B2	19	22N	11E	3625
South Fork Tolt	21B18	26	26N	9E	1900
Skykomish River					
Lake Elizabeth	21B19	33	26N	10E	2900
Skagit River					
Beaver Creek Trail	21A4	35	39N	12E	2200
Beaver Pass	21A1	9	39N	12E	3680
Devils Park	20A4	34	38N	16E	5900
Freezeout Creek Trail	20A1	14	40N	14E	3500
Freezeout Meadows	20A2	8	40N	16E	5000
Lake Hozomeen	21A2	19	40N	14E	2600
Meadow Cabins	20A8	29	36N	14E	1900
Thunder Basin	20A7	15	35N	14E	4200
Baker River					
Dock Butte	21A11A	8	36N	8E	3800
Easy Pass	21A7A	19	39N	11E	5200
Jasper Pass	21A6A	17	38N	11E	5400
Koma Kulshan	21A17	31	37N	9E	800
Marten Lake	21A9A	23	38N	8E	3600
Rocky Creek	21A12A	20	37N	8E	2100
Schreibers Meadow	21A10A	18	37N	8E	3400
S. F. Thunder Creek	21A11A	20	36N	9E	2200
Sulphur Creek	21A13	22	37N	8E	1600
Three Mile Creek	21A15	18	36N	9E	1600
Watson Lakes	21A8	25	37N	9E	4500
Nooksack River					
Panorama	21A5	17	39N	9E	4300
OLYMPIC PENINSULA					
Dungeness River					
Deer Park	23B4	1	28N	5W	5200
Elwha River					
Hurricane	23B3	36	29N	7W	4500
Skokomish River					
Black and White	23B7	17	24N	5W	4200
Black and White Lakes	23B6	16	24N	5W	4700
Home Sweet Home	23B5	28	25N	5W	5200
Sundown Pass	23B8	25	24N	7W	3900

LEGEND

NUMBERING SYSTEM EXAMPLE

21A7 SNOW COURSE ONLY

21A7a AERIAL MARKER ONLY

21A7A SNOW COURSE AND AERIAL MARKER

21A7M SNOW COURSE AND SOIL MOISTURE STATION

WATER SUPPLY OUTLOOK

State of Washington
April 1, 1963

* *

The water supply outlook for irrigation and power in Washington has further deteriorated from that which was reported last month. Measurements of snow cover for the first of the month indicate that very little snow fell during the month of March until the last three days of the month. The storm during this period deposited a considerable amount of snow but not enough to make up for the monthly deficit. The snowpack now varies from 90% below normal for the Cedar River to 29% below normal for Ahtanum Creek. The soil mantle beneath the snowpack is generally soaked except for the Okanogan and Walla Walla areas. Precipitation during the past month was generally near normal. Reservoir storage continues to be good except for reservoirs in the Okanogan watershed.

* *

PEND OREILLE-SPOKANE RIVERS

There are 9-11 snow courses in the Pend Oreille River drainage with 5-26 years of record. These courses have a snowpack that is 56% of normal, 52% of last year and 53% of 1961. On the Spokane watershed there are 12 courses with 24-40 years of record. These courses indicate a snowpack that is 51% of normal, 46% of last year and 53% of 1961. Forecasts of streamflow have been reduced from that which was reported last month. Flows are now expected to be 76% of normal for the Pend Oreille and 56% of normal for the Spokane. Valley precipitation in this area was normal during the month of March.

COLVILLE-KETTLE RIVERS

The Colville-Kettle watersheds continue to be the two bright spots in the state. Forecasts of these watersheds still are expected to be below normal. Precipitation during the month of March was above normal while winter precipitation was below. The snowpack in this area is still below normal. The storms which occurred during the latter part of this last month helped the water supply situation and account for some of the increase in the forecast for the Colville River at Kettle Falls. The storms were not as severe farther north which in part account for the decrease of the Kettle near Laurier from that which was reported last month.

There are 2-10 courses in the Kettle River drainage with 2-25 years of record. These courses indicate a snowpack that is 63% of normal, 35% of last year and 41% of 1961. The 3 courses in the Colville drainage do not have sufficient records to be compared to normal but these courses indicate a snowpack that is 28% of last year and 32% of 1961.

Although there are no soil moisture stations in this area, precipitation that occurred during the fall period indicates a soil mantle that is wetted more than normal. Very little of the snowpack will be required to further wet these soils before spring runoff can occur. Forecast of the Kettle River as measured near Laurier is for a flow 80% of normal for the April-September period. The Colville River as measured at Kettle Falls is expected to have a flow that is 94% of normal. The Columbia River as measured at Birchbank, B. C. is expected to have a flow 89% of normal.

OKANOGAN-METHOW RIVERS

The outlook for irrigation and water supplies in these watersheds has deteriorated from that which was reported last month. Unless we have a cool wet spring as was experienced last year, there will be a definite water shortage during the latter part of the irrigation season. Reservoirs in this area were sadly depleted last year and inflow is not expected to be enough to bring these reservoirs up to capacity and still meet the needs of the water users. Users of the mainstem water supply will also feel this shortage during the late summer months.

The Okanogan watershed, with 20-29 snow courses and 4-27 years of record, indicates a snowpack that is 55% of normal, 72% of last year and 64% of 1961. The Methow River drainage, with 6-10 snow courses and 4-29 years of record, has a snowpack that is 59% of average, 74% of 1961 and 115% of last year. This high figure percentagewise for the Methow is explained by the readings of aerial markers on March 31. Water contents are estimated at these aerial stadia markers and the density of the new fallen snow could be estimated too high which would account for the greater amount of water in the snowpack at these locations than is actually there.

The one soil moisture station in British Columbia continues to read a very dry soil mantle, less moisture than last year but slightly more than 1961. This dry soil will take a considerable amount of water from the snowpack which will leave less for spring runoff.

The mainstems of the Okanogan and Similkameen are now expected to flow 60% and 62%, respectively. Inflow to Salmon Lake and Conconully Reservoir is still expected to be 48% of normal. The new station, Methow near Pateros, is expected to have a runoff that is 68% of the computed 1943-57 average.

WENATCHEE-CHELAN-ENTIAT RIVERS

The storms which occurred near the latter part of March did not increase the water potential in the watersheds to any marked degree. The outlook is still very poor for spring and summer flows. As there is no storage of any consequence in the main portion of these watersheds, late spring and summer flows will be very low and a water shortage is likely in these areas without storage. Storage facilities that are available should be held as late as possible in order to overcome this condition.

The 15 snow courses in the Chelan area are reported to be 50% of the 1943-57 average, 72% of last year at this time and 52% of 1961. In the Wenatchee the 4-9 courses with 2-31 years of record indicate a snowpack that is only 43% of average, 40% of last year at this time and 34% of 1961. All of the snow courses in the Squilchuck-Stemilt area are bare and Blewett Pass in the same area has only 1.4 inches of water as compared to an average of 18.8.

Precipitation that fell during the month of March was below normal, that which fell during the winter was much below normal and that which fell last fall slightly above. Soil mantles, therefore, will be quite dry in comparison and a greater portion of the snowpack will re required to prime these soils before runoff can occur. Forecasts of streamflow range from a low of 60% on the Wenatchee to 69% on the Stehekin. The Stemilt basin forecast has not been changed from that which was reported last month.

YAKIMA RIVER

The outlook for irrigation and water supply in the Yakima watershed as of April 1 is very close to that which was reported last month. Irrigation reservoirs are filled to a near-record amount for this time of year and will adequately serve the water users dependent upon reservoired water. Water users that do not have storage rights will experience short water supplies during the late summer irrigation season. The storms which occurred during the latter part of the month of March helped the situation immensely but did not put on the watershed the normally expected increment of snowfall. If these storms had not occurred the situation would have been even more serious than it is at the present time.

There are 14-22 snow courses in the watershed with 2-44 years of record. The snowpack at these courses is 38% of normal, 47% of last year at this time and 44% of 1961. On the Ahtanum sub-drainage, the 2 snow courses with 13-14 years of record indicate a snowpack that is 71% of normal and 60% of that which occurred in 1962 and 1961.

The one soil moisture station in the Yakima watershed indicates a soil that is still very near to its moisture holding capacity. It has been reported by snow surveyors that the soil beneath the snowpack is in a saturated condition. Very little of the existing snowpack will be required to satisfy the soil mantle needs and all of the water in the snowpack will be available for spring runoff. Streamflow forecasts range from a high of 77% of normal for the Ahtanum Creeks as measured near Tampico to a low of 36% of normal for the Yakima River as measured near Parker. The "odd" order of forecasts of the Yakima at Parker is still what is expected as of April 1 and as reported last month, this is explained by the unmeasured diversions and return flow.

WALLA WALLA RIVER

As reported last month, summer flows of streams in the Walla Walla watershed will be much below average because of the record low snowpack in the mountains. Recent storms that occurred near the end of last month put a near normal March increment of snow on the snow courses but this was not enough to make up the large deficit that has been in existence all winter.

The one snow course on the watershed, Tollgate, which has any record for use for comparison purposes has a snowpack as of April 1 that is 31% of average and 38% of last year. Snow courses in the Washington portion of the drainage have a snowcover that is 16% of last year and 30% of 1961.

The 4 soil moisture stations in Washington and Oregon indicate a soil mantle that is filled to nearly 90% of capacity--a slight decrease from that which was measured last month. Some soil moisture stations report a better soil mantle condition than last year and some not as good. On an average, conditions are similar to last year. Forecasts for the two stations, one in Washington and one in Oregon, are very near those reported last month. Mill Creek as measured near Walla Walla has been reduced from that which was reported before and the Walla Walla South Fork near Milton is exactly the same. Unless above normal spring precipitation occurs, water will be extremely short during the latter portion of the summer.

LOWER COLUMBIA DRAINAGE

The snowpack in the lower Columbia drainage in Washington is very near that which was projected last month: White Salmon, 42% of normal; Lewis, 42% of normal; and Cowlitz, 43% of normal. This is compared to the March 1 projections of 41%, 40% and 45%, respectively. The storms which occurred during the latter part of March are responsible for most of this near normal increase. Only one of the three key snow courses received a greater than expected March increment of snow during the month, which accounts in part for the change in forecasts. Valley precipitation during the month of March was normal as reported by the U.S. Weather Bureau. Streamflow was the same as last year but below the 1943-57 base normal.

The forecast for the Lewis as measured at Ariel Dam is for a flow 75% of the base period for April-September, or 1,055,000 acre feet. The Cowlitz is expected to flow 2,010,000 acre feet or 70% of normal for the same period.

PUGET SOUND

Snow cover in these watersheds is again the lowest experienced in the state. Snow cover varies from 90% below normal on the Cedar River to 51% below for the Nisqually. No forecasts are made at this time of any streams flowing west from the Cascades into Puget Sound. Valley precipitation in this area was below normal for the month of March as it has been during the winter months.

In comparing the snowpack with that which was experienced last year at this time, the Nisqually is 60%, White 64%, Green 50%, Cedar 26%, Snoqualmie 35%, Skykomish 43%, Skagit 73%, Baker 74% and Nooksack 87%.

OLYMPIC PENINSULA

Snow cover in the Olympic Peninsula cannot be fully evaluated this month. Circumstances delayed the measurements from Deer Park and Hurricane so they are not included in this report. The forecast for the Dungeness as measured near Sequim is also not available at this time. When this information is available it will be relayed to the Soil Conservation representative at Port Angeles for distribution through the local news media. The information from the Skykomish River watershed is available and indicates a snowpack that is 39% of average, 56% of last year and 38% of normal. Valley precipitation during the month of March was well below normal.

STREAMFLOW FORECASTS - APRIL 1963

The following summarized runoff forecasts are based principally on mountain snow cover and on the assumption that precipitation and temperature will be near average from the present time to the end of the forecast period. Appreciable deviations from normal of temperature and/or precipitation will correspondingly modify these forecasts.

Basin, Stream and Station	Forecast Runoff 1963	% 15-Yr. Avg.	Forecast Period	Seasonal Streamflow in Thousands of Acre-Feet Measured Runoff 1962	1961	1960	15-Yr. Average 1943-57
UPPER COLUMBIA BASIN							
Columbia River System							
Columbia River at Grand Coulee 1/	56200	83	Apr-Sep	62511	71701	65388	67448
	46500	82	Apr-Jul	51153	61470	54323	56513
	34500	80	Apr-Jun	39741	51164	40279	43374
Columbia River bl. Priest Rapids Dam 1/	59290	80	Apr-Sep	67661	78160	72000	74246
	48750	78	Apr-Jul	55670	67352	60112	62298
	36750	77	Apr-Jun	43323	55961	44892	47840
Columbia River at The Dalles,Ore. 1/	78560	74	Apr-Sep	92980	101454	96707	106063
	64500	72	Apr-Jul	77320	87843	81479	90194
	51500	72	Apr-Jun	62704	74451	63930	71981
Pend Oreille River System							
Pend Oreille River bl. Box Canyon 1/	12560	76	Apr-Sep		15435	15101	16558
	11450	75	Apr-Jul		14521	13787	15217
	9500	73	Apr-Jun		13273	12075	12928
Kettle River System							
Kettle River nr. Laurier	1550	80	Apr-Sep		2095	1789	1943
	1480	80	Apr-Jul		2048	1733	1849
	1320	79	Apr-Jun		1961	1595	1677
Colville River at Kettle Falls	150	94	Apr-Sep		233	214	160
	140	95	Apr-Jul		217	197	148
	130	96	Apr-Jun		202	186	136

1/ Observed flow corrected for storage in any of the following reservoirs which are above the station: Kootenay Lake, Hungry Horse, Flathead Lake, Pend Oreille Lake, F. D. Roosevelt Lake, Lake Chelan, Coeur d'Alene Lake, Brownlee, Noxon Reservoir and pumpage at F. D. Roosevelt Lake.

Streamflow Forecasts - April 1963 (Cont'd)

Basin, Stream and Station	Forecast Runoff 1963	% 15-Yr. Avg.	Forecast Period	Seasonal Streamflow in Thousands of Acre-Feet: Measured Runoff 1962	1961	1960	15-Yr. Average 1943-57
Spokane River System*							
Spokane River at Post Falls, Ida.2/	1800	56	Apr-Sep		3019	3004	3251
	1720	54	Apr-Jul		2958	2908	3154
	1650	55	Apr-Jun		2860	2797	2997
Okanogan River System**							
Similkameen River nr. Nighthawk	1010	62	Apr-Sep		1499	1305	1640
	960	63	Apr-Jul		1438	1233	1527
	820	63	Apr-Jun		1318	1090	1304
Okanogan River at Oroville 3/	440	58	Apr-Sep		661	714	757
	420	59	Apr-Jul		645	622	706
	375	58	Apr-Jun		602	575	648
Okanogan River nr. Tonasket	1150	60	Apr-Sep		1669	1448	1920
	1060	61	Apr-Jul		1557	1326	1740
	910	62	Apr-Jun		1409	1165	1469
Salmon Lake - Conconully Res. - Inflow	11	48	Apr-Jul	6	16	12	23
Methow River System**							
Methow River nr. Pateros	785	68	Apr-Sep	633	1078	972	1145
	730	68	Apr-Jul	570	1032	906	1070
	610	67	Apr-Jun	483	946	772	914
Chelan River System							
Chelan River at Chelan 4/	840	65	Apr-Sep		1333	1211	1288
	750	66	Apr-Jul		1221	1093	1140
	600	66	Apr-Jun		1032	839	902
Stehekin River at Stehekin	615	69	Apr-Sep		991	869	897
	535	69	Apr-Jul		874	756	773
	405	69	Apr-Jun		724	560	587

* Forecasts made by Morlan W. Nelson and J. Alden Wilson, Soil Conservation Service, Boise, Idaho.

** These forecasts are based in part upon base flow data especially prepared and furnished for the purpose by the U. S. Geological Survey.

2/ Observed flow corrected for storage in Coeur d'Alene Lake and diversions by Spokane Valley Farms Company and Rathdrum Prairie Canals.

3/ Observed flow corrected for storage, diversions and evaporation.

4/ Observed flow corrected for storage in Lake Chelan.

Streamflow Forecasts - April 1963 (Cont'd)

Basin, Stream and Station	Forecast Runoff 1963	% 15-Yr. Avg.	Forecast Period	Seasonal Streamflow in Thousands of Acre-Feet: Measured Runoff 1962	1961	1960	15-Yr. Average 1943-57
Wenatchee River System							
Wenatchee River at Plain	845	63	Apr-Sep		1396	1227	1343
	780	64	Apr-Jul		1303	1127	1221
	640	66	Apr-Jun		1124	901	973
Wenatchee River at Peshastin	1110	60	Apr-Sep		1892	1605	1862
	1040	61	Apr-Jul		1776	1489	1704
	880	64	Apr-Jun		1543	1210	1367
Stemilt Basin nr. Wenatchee	98*	--	May-Sep	146*	128*	117*	--
Yakima River System							
Yakima River nr. Martin 5/	76	48	Apr-Sep		152	130	158
	67	46	Apr-Jul		145	121	147
	62	49	Apr-Jun		136	112	127
Yakima River at Cle Elum 6/	465	45	Apr-Sep		1026	819	1029
	425	45	Apr-Jul		965	753	951
	390	47	Apr-Jun		881	676	824
Yakima River nr. Parker 7/	710	36	Apr-Sep		1974	1415	1967
	745	38	Apr-Jul		1996	1424	1947
	755	42	Apr-Jun		1920	1386	1779
Kachess River nr. Easton 8/	55	40	Apr-Sep		137	110	138
	51	38	Apr-Jul		134	105	133
	49	42	Apr-Jun		125	99	117
Cle Elum River nr. Roslyn 9/	250	48	Apr-Sep		522	402	518
	230	48	Apr-Jul		490	375	479
	205	51	Apr-Jun		437	327	403

* Thousands of Miners' inches.

5/ Observed flow corrected for storage in Lake Keechelus.

6/ Observed flow corrected for storage in Keechelus, Kachess and Cle Elum Lakes and diversion by Kittitas Canal.

7/ Observed flow corrected for storage in Keechelus, Kachess, Cle Elum, Bumping and Rimrock Lakes and diversion by Roza, Union Gap, New Reservation, Old Reservation and Sunnyside Canals.

8/ Observed flow corrected for storage in Lake Kachess.

9/ Observed flow corrected for storage in Lake Cle Elum.

Streamflow Forecasts - April 1963 (Cont'd)

Basin, Stream and Station	Forecast Runoff 1963	% 15-Yr. Avg.	Fore-cast Period	Seasonal Streamflow in Thousands of Acre-Feet: Measured Runoff 1962	1961	1960	15-Yr. Average 1943-57
Yakima River System (Cont'd							
Bumping River							
nr. Nile 10/	92	57	Apr-Sep		168	131	161
	85	57	Apr-Jul		158	123	149
	75	62	Apr-Jun		137	108	121
American River							
nr. Nile	75	55	Apr-Sep		152	109	137
	70	55	Apr-Jul		143	102	127
	63	59	Apr-Jun		125	88	106
Tieton River							
at Tieton Dam 11/	165	60	Apr-Sep		279	232	273
	140	59	Apr-Jul		240	199	236
	115	61	Apr-Jun		200	165	188
Naches River							
nr. Naches 12/	520	53	Apr-Sep		1020	767	974
	470	53	Apr-Jul		939	704	894
	415	54	Apr-Jun		832	622	761
Ahtanum Creeks							
nr. Tampico 13/	40	77	Apr-Sep		58	40	52
	36	75	Apr-Jul		54	36	48
	33	79	Apr-Jun		49	33	42
LOWER COLUMBIA BASIN							
Lower Columbia River System							
Mill Creek							
nr. Walla Walla	19	56	Apr-Sep	27	27	27	34
	16	53	Apr-Jul	23	23	22	30
	14	52	Apr-Jun	21	21	20	27
Lewis River							
at Ariel 14/	1055	75	Apr-Sep		1247	1520	1409
	910	72	Apr-Jul		1105	1355	1254
	810	74	Apr-Jun		1007	1248	1100
Cowlitz River							
at Castle Rock	2010	70	Apr-Sep		2802	2974	2870
	1750	68	Apr-Jul		2516	2652	2553
	1520	70	Apr-Jun		2230	2372	2167

10/ Observed flow corrected for storage in Bumping Lake.
11/ Observed flow corrected for storage in Rimrock Lake.
12/ Observed flow corrected for storage in Bumping and Rimrock Lakes and diversion by Tieton, Selah Valley, Wapatox Canals and City of Yakima.
13/ Observed flow of North and South Forks (combined).
14/ Observed flow corrected for storage in Lake Merwin, Yale and Swift Reservoirs.

COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

The following tabulation of Washington stream basins presents the water content of the snow about April 1, 1963 as per cent of the same date in 1962 and 1961 and average of record.

Tributary Basin	No. of Courses Average	Years of Record	1963 Snow Water Expressed as per cent of 1962	1961	1943-57 Avg.
UPPER COLUMBIA BASIN					
Pend Oreille	9 - 11	5 - 26	52	53	56*
Kettle	2 - 10	2 - 25	35	41	63*
Colville	3	4 - 5	28	32	--
Spokane	12	24 - 40	46	53	51*
Sanpoil	1	24	46	38	47*
Okanogan	20 - 29	4 - 27	72	64	55*
Methow	6 - 10	4 - 29	115	74	59*
Chelan	15	29 - 32	72	52	50
Wenatchee	4 - 9	2 - 31	40	34	43*
Yakima	14 - 22	2 - 44	47	44	38*
Ahtanum	2	13 - 14	60	60	71*
LOWER COLUMBIA BASIN					
Mill Creek	3	6 - 8	16	30	--
Klickitat	2	6 - 8	1	2	--
White Salmon	2	18 - 19	47	43	42*
Lewis	4 - 15	2 - 19	46	41	42*
Cowlitz	5 - 8	2 - 23	51	43	43*
PUGET SOUND					
Nisqually	4	13	60	52	49*
White	5	7 - 23	64	50	48*
Green	1 - 9	2 - 17	50	52	47*
Cedar	5 - 7	4 - 17	26	32	10*
Snoqualmie	1 - 3	5 - 18	35	40	25*
Skykomish	1 - 2	5 - 18	43	47	48*
Skagit	15	12 - 32	73	53	47*
Baker	12	3 - 6	74	63	--
Nooksack	1	6	87	67	--
OLYMPIC PENINSULA					
Skokomish	3 - 4	4 - 13	56	38	39*

* Records of less than 15 years used in computation of average

RESERVOIR STORAGE - 1000 Acre Feet

BASIN or STREAM	RESERVOIR 1/	USABLE CAPACITY	Measured (April 1) 1963	1962	1961	Normal*
		COLUMBIA				
Spokane	Coeur d'Alene Lake	889.0	177.0	157.0	198.6	168.5
Columbia	Franklin D. Roosevelt Lake	5232.0	2803.0	2662.0	2551.0	3637.8
Columbia	Banks Lake 2/	761.8	297.0	486.4	562.0	---
Okanogan	Conconully Reservoir	13.0	5.6	5.6	6.5	7.5
Okanogan	Salmon Lake	10.5	5.1	7.6	8.6	8.8
Chelan	Lake Chelan	676.1	326.0	140.2	79.3	208.4
		YAKIMA				
Yakima	Keechelus Lake	157.8	139.4	110.6	101.4	96.2
Kachess	Kachess Lake	239.0	231.0	193.8	181.0	180.7
Cle Elum	Lake Cle Elum	436.9	375.2	296.8	315.2	274.6
Bumping	Bumping Lake	33.7	32.7	14.1	16.6	14.9
Tieton	Rimrock Lake	198.0	194.9	142.2	150.8	129.9
		PUGET SOUND				
Skagit	Ross Reservoir	1202.9	1149.1	745.3	962.6	285.4
Skagit	Diablo Reservoir	90.6	85.0	83.2	87.1	82.4
Skagit	Gorge Reservoir	9.8	7.7	8.4	---	---

1/ Based on Active Storage.

2/ Less than 15-year record in period 1943-57.

* 15-year average 1943-57.

SOIL MOISTURE - APRIL

Drainage Basin and Station	Number	Elev.	Profile (Inches) Depth	Profile (Inches) Total Capacity	Soil Moisture Content (Inches) as of April 1 1963	1962	1961
CRAB CREEK							
Creston-Kunz	18B1M	2440	48	13.6	10.55	11.09	10.62
Govan	18B2M	2100	48	13.6	11.81	12.27	12.27
Jack Woods	18B3M	2600	48	13.6	9.48	10.74	9.74
Krause	18B4M	2440	48	13.6	9.66	8.74	9.23
Sheffels	18B5M	2360	48	13.6	7.77	6.72	9.24
Wheatridge	18B6M	2200	48	13.6	8.58	7.66	8.42
OKANOGAN							
Trout Creek	3-M	3600	48	7.3	2.82*	3.00*	2.75*
YAKIMA							
Lake Cle Elum	21B14M	2200	48	12.8	12.65	13.25	12.41
WALLA WALLA							
Couse	17C3M	3650	48	11.1	9.19	10.29	10.39
Helmers	17C2M	4400	48	12.0	11.56	11.40	11.80

* Previous month measurements

FALL SOIL MOISTURE

Drainage Basin and Station	Number	Elev.	Profile (Inches) Depth	Profile (Inches) Total Capacity	Soil Moisture Content (Inches) as of Oct. 1 1962	1961	1960
CRAB CREEK							
Creston-Kunz	18B1M	2440	48	13.6	9.40	4.25	4.04
Govan	18B2M	2100	48	13.6	9.95	5.60	5.08
Jack Woods	18B3M	2600	48	13.6	7.06	7.35	3.87
Krause	18B4M	2440	48	13.6	9.47	4.99	4.84
Sheffels	18B5M	2360	48	13.6	6.69	3.67	4.07
Wheatridge	18B6M	2200	48	13.6	7.49	4.09	4.79
OKANOGAN							
Trout Creek	3-M	3600	48	7.3	2.80	3.00	3.00
YAKIMA							
Lake Cle Elum	21B14M	2200	48	12.8	6.80	9.50	7.00
WALLA WALLA							
Couse	17C3M	3650	48	11.1	7.20	6.60	---
Helmers	17C2M	4400	48	12.0	7.60	6.90	---

PRECIPITATION 1/

Division Averages and Departures

DRAINAGE DIVISIONS	FALL Sept-Nov. 1962 2/ Observed	Departure	WINTER Dec.'62-Feb.'63 2/ Observed	Departure	SPRING March 1963 2/ Observed	Departure
Columbia in Canada	6.18	+ 0.41	7.33	- 0.95	1.57	+ 0.13
Pend Oreille - Spokane	10.30	+ 1.47	8.97	- 2.51	2.92	+ 0.02
Northeastern Washington	6.34	+ 1.12	4.43	- 2.04	1.78	+ 0.20
Southeastern Washington	7.14	+ 1.24	5.79	- 1.75	2.12	+ 0.07
Central Washington	14.27	+ 1.18	11.75	- 9.68	3.84	- 0.52
North Central Washington	3.23	+ 0.04	2.45	- 1.05	0.88	- 0.05
Northwest Slope Cascades	24.41	+ 1.88	23.11	- 8.59	6.31	- 1.67
Southwest Slope Cascades	23.63	+ 6.82	15.29	- 9.42	6.13	+ 0.12
Blue Mountains, Oregon	6.51	+ 1.72	5.13	- 2.34	1.71	- 0.24
Lower Columbia in Oregon	6.56	+ 1.22	5.39	- 2.60	1.68	- 0.13

Northeastern Washington - Lower Spokane, Colville, Sanpoil and Lower Kettle Drainages.

Southeastern Washington - Touchet, Tucannon and Palouse Drainages.

Central Washington - Yakima, Wenatchee and Chelan Drainages.

North Central Washington - Methow and Okanogan Drainages.

Northwest Slope Cascades - Puget Sound Drainages.

Southwest Slope Cascades - Lower Columbia Drainages.

1/ - Preliminary analysis by U. S. Weather Bureau from data furnished by Meteorological Services of Canada and U. S. Weather Bureau.

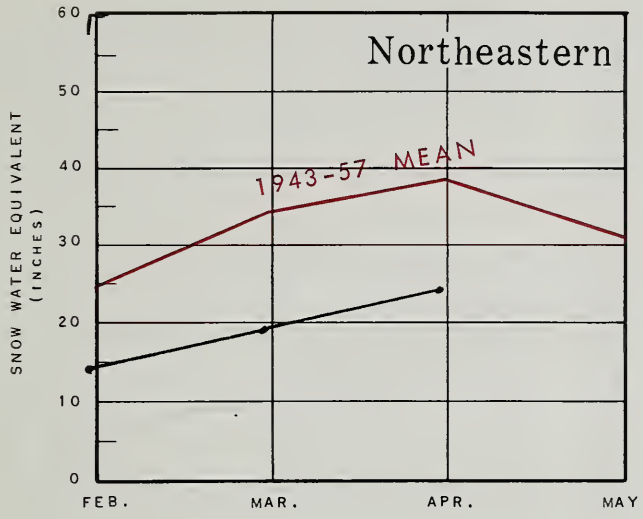
2/ - Departure from 15-year (1943-57) drainage division average.

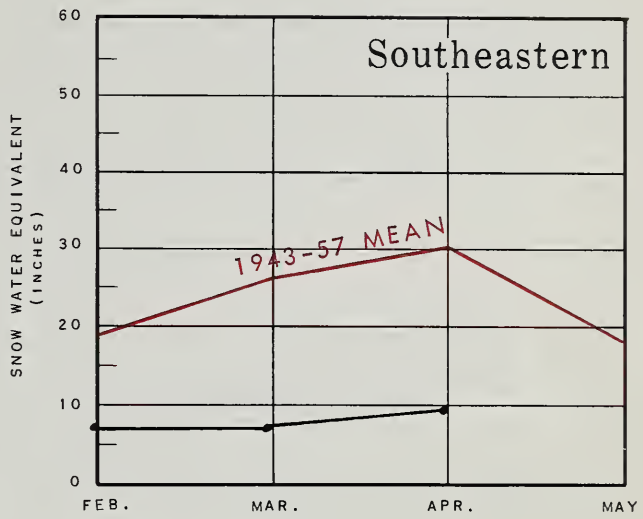
Note - Precipitation shown in inches.

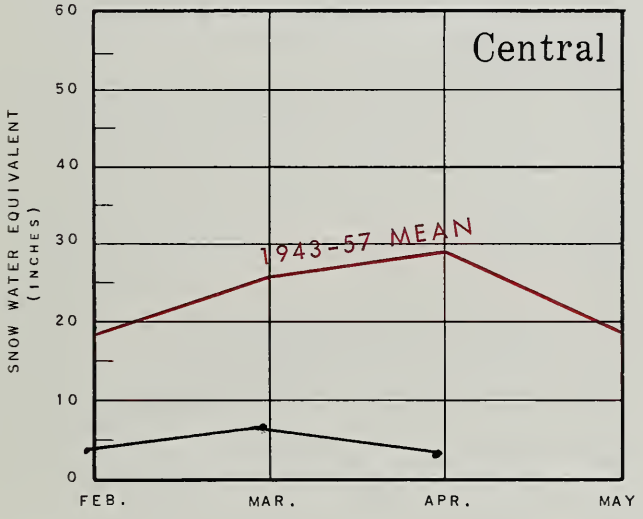
WASHINGTON SNOW COVER

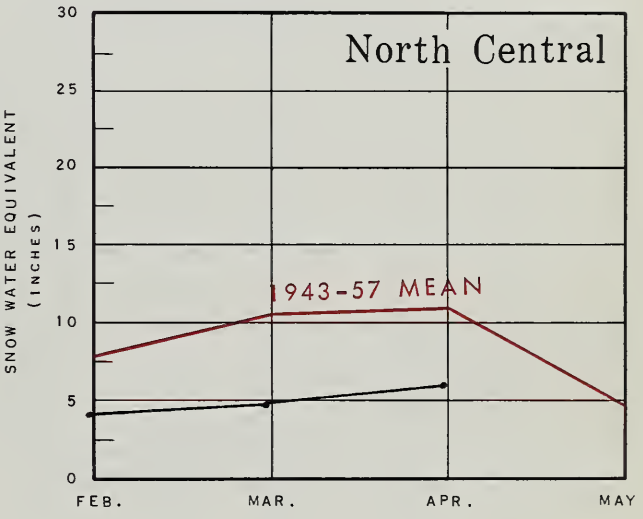
1963

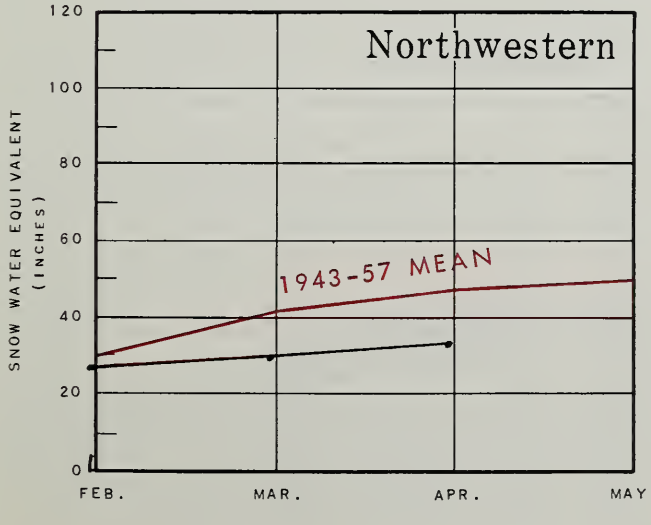
DRAINAGE AREAS

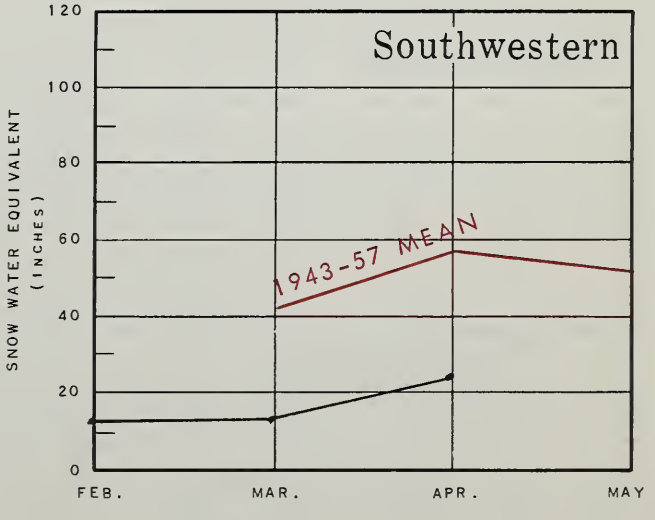










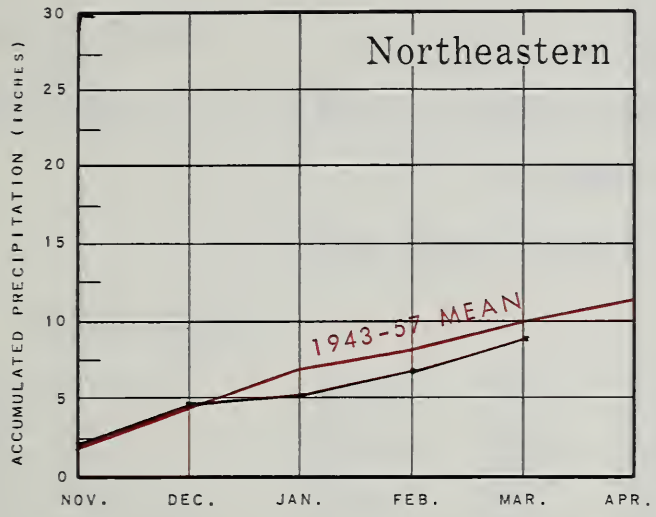


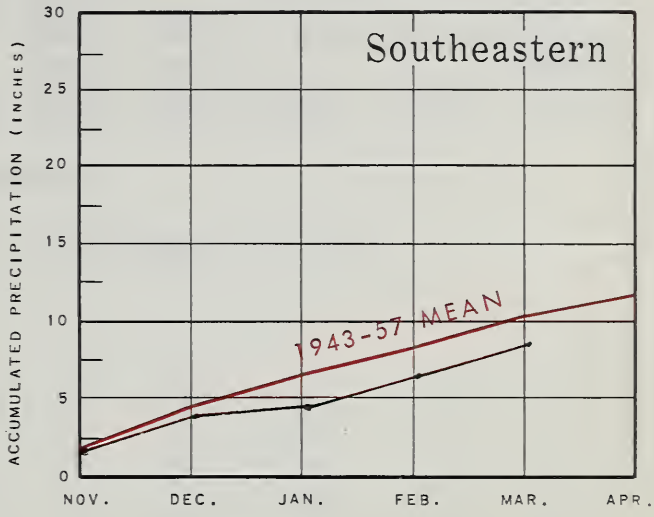
Selected Snow Survey Courses by Soil Conservation Service

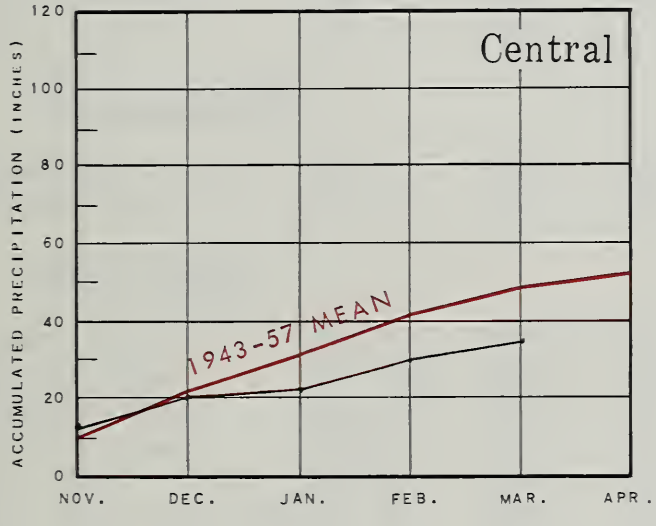
WASHINGTON VALLEY PRECIPITATION

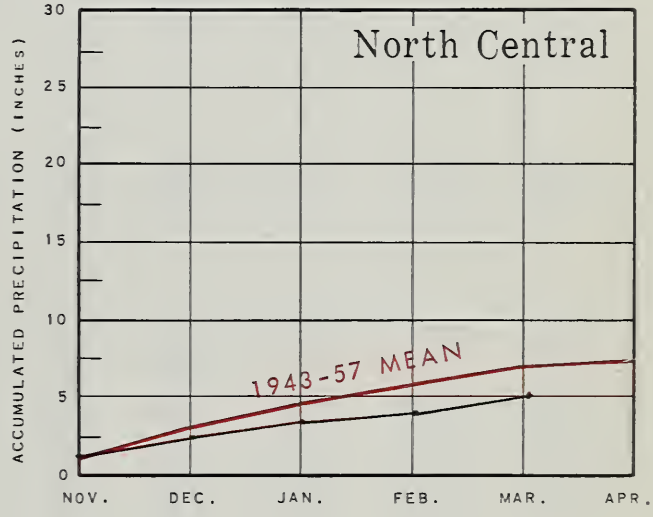
1962 - 1963

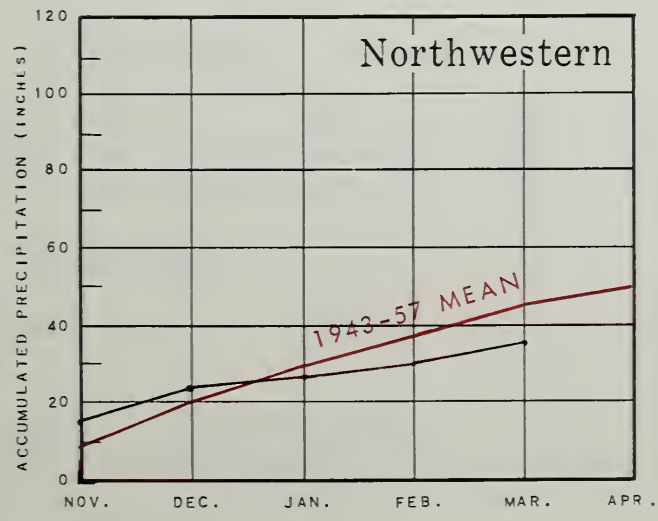
DRAINAGE AREAS

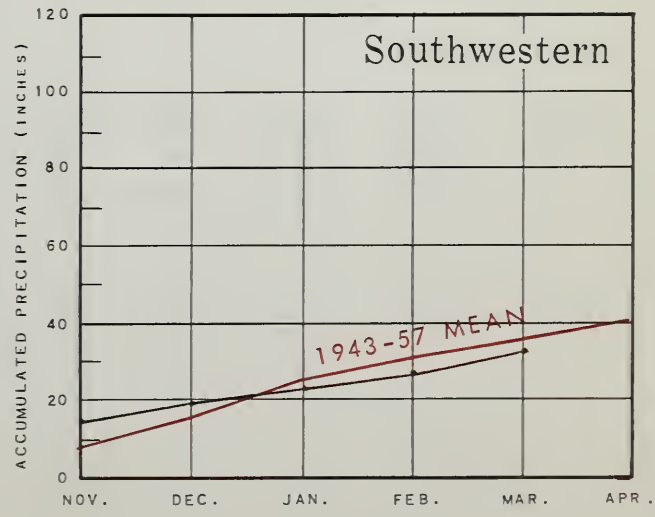












Preliminary Analysis by U. S. Weather Bureau

APPENDIX 1

SNOW DATA APRIL 1, 1963

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT 1963 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) :1962	1961	1943-57 Avg.
MID-MONTH SURVEYS								
Snow Surveys made on or about March 15, 1963								
KETTLE RIVER								
Boulder Road	18A 2	1450	3/12	0	0.0	6.3	--	--
Butte Creek	18A 3	4070	3/12	11	2.9	12.7	--	--
Cabin Creek	18A 8	3170	3/12	7	2.0	12.0	--	--
Goat Creek	18A 4	3595	3/12	0	0.0	11.1	--	--
Snow Caps Creek	18A 5	2150	3/12	0	0.0	6.0	--	--
Snow Caps Trail	18A 6	2720	3/12	0	0.0	8.5	--	--
Summit G. S.	18A 7	4600	3/12	12	3.2	12.0	--	--
WENATCHEE RIVER								
Leavenworth R. S.	20B 17	1127	3/15	0	0.0	--	--	--
Stevens Pass	21B 1	4070	3/13	68	19.5	43.1	57.0	48.2*
YAKIMA RIVER								
Bumping Lake	21C 8	3450	3/14	12	4.3	13.0	17.5	19.6*
Lake Cle Elum	21B 14M	2200	3/14	0	0.0	0.0	9.6	12.4*
#Stampede Pass	21B 10	3000	3/15	55	19.4	33.6	46.8	50.2*
Tunnel Avenue	21B 8	2450	3/14	13	6.2	17.9	33.5	28.0*
White Pass	20C 9	4500	3/15	36	14.0	26.6	33.6	37.8*
White Pass (Ea. Side)	21C 28	4500	3/14	28	9.4	17.4	26.4	32.0*
White Pass(Leach Lk.)	21C 27	4500	3/15	33	11.0	23.8	29.9	--
COWLITZ RIVER								
#White Pass	20C 9	4500	3/15	36	14.0	26.6	33.6	37.8*
#White Pass(Ea.Side)	21C 28	4500	3/14	28	9.4	17.4	26.4	32.0*
#White Pass(Leach Lk)	21C 27	4500	3/15	33	11.0	23.8	29.9	--
GREEN RIVER								
Stampede Pass	21B 10	3000	3/15	55	19.4	33.6	46.8	50.2*

* Adjusted 1943-57 average
\# Not located directly on this drainage

APPENDIX 2

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT 1963 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1962	1961	1943-57 Avg.
Snow surveys made on or about March 15, 1963 (Cont'd)								
SKYKOMISH RIVER								
#Stevens Pass	21B 1	4070	3/13	68	19.5	43.1	57.0	48.2*
BAKER RIVER								
Jasper Pass 1/	21A 6A	5400	3/12	124	52.1	62.1	--	--
#Panorama	21A 5	4300	3/15	98	42.2	--	--	--
Rocky Creek 1/	21A 12A	2100	3/12	4	1.4	20.8	--	--
S.F. Thunder Creek 1/	21A 14A	2200	3/12	0	0.0	3.5	--	--
NOOKSACK RIVER								
Panorama	21A 5	4300	3/15	98	42.2	--	--	--

* Adjusted 1943-57 average
\# Not directly on this drainage
1/ Snow water equivalent estimated from aerial stadia observations

APPENDIX 3

SNOW DATA APRIL 1, 1963

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT 1963 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1962	1961	1943-57 Avg.
UPPER COLUMBIA DRAINAGE								
PEND OREILLE RIVER								
Baree Creek	15B 11	5500	4/1	94	31.7	51.2	52.1	48.7*
Benton Meadow	16A 2	2344	3/27	0	0.0	4.3	0.1	3.0
Benton Spring	16A 3	4900	3/27	26	8.8	21.4	21.4	22.9
Boyer Mountain	17A 2	5250	3/30	56	17.6	32.4	33.3	28.4*
Brush Creek	14A 4	5000	3/25	21	6.8	10.7	12.2	15.2*
Bunchgrass Meadow	17A 1	5000	3/27	57	18.0	32.3	38.1	30.9
#Chewelah	17A 4	4925	3/26	31	9.2	22.7	19.8	--
Hoodoo Creek	15C 1	6200	3/26	85	32.8	50.7	51.8	53.2
Lookout	15B 2	5250	4/1	79	24.1	42.8	37.3	39.0
Mosquito Ridge 1/	16A 4A	5110	4/2	82	25.0	41.8	39.8	38.3
Nelson	Canada	3050	3/29	22	6.3	16.5	18.8	17.3
Smith Creek	16A 1	4800	4/1	103	33.2	46.5	57.9	49.6
Winchester Creek	17A 3	2970	3/29	3	1.0	16.4	10.7	--
KETTLE RIVER								
Barnes Creek	Canada	5300	3/28	55	17.5	21.8	20.5	--
Boulder Road	18A 2	1450	3/28	0	0.0	3.5	0.0	--
Butte Creek	18A 3	4070	3/28	12	2.4	14.0	12.3	--
Cabin Creek	18A 8	3170	3/28	4	1.5	12.5	10.5	--
Carmi	Canada	4100	4/1	6	1.7	New Course		
Farron	Canada	4000	3/28	19	5.8	16.2	18.3	14.0
Goat Creek	18A 4	3595	3/28	0	0.0	10.5	7.4	--
Monashee Pass	Canada	4500	3/28	37	11.5	15.7	14.5	13.3**
Snow Caps Creek	18A 5	2150	3/28	0	0.0	4.0	0.0	--
Snow Caps Trail	18A 6	2720	3/28	0	0.0	8.5	6.5	--
Summit G. S.	18A 7	4600	3/28	15	3.2	12.6	11.1	--
COLVILLE RIVER								
Baird	17A 6	3215	3/27	0	0.0	7.0	5.2	--
Carlson	18A 9	2885	3/29	0	0.0	2.2	--	--
#Chewelah	17A 4	4925	3/26	31	9.2	22.7	19.8	--
Stranger Mountain	17A 5	4990	3/27	11	4.1	17.3	16.0	--
Togo	18A 10	3370	3/29	4	1.4	13.3	--	--

1/ Snow water equivalent estimated from aerial stadia observations
\# Not directly on this drainage
* Adjusted 1943-57 average
** Average for years of record

APPENDIX 4

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT 1963 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1962	1961	1943-57 Avg.
SPOKANE RIVER								
Above Burke	15B 8	4100	3/12	43	13.1	27.8	20.2	21.0
Above Roland	15B 7	4350	3/13	50	16.9	32.5	35.1	29.8
Below Roland	15B 6	3770	3/13	20	6.7	19.0	14.4	14.4
Copper Ridge	16B 2	4800	3/29	35	12.0	34.4	28.6	32.8
Forty-nine Meadows	15B 3	5000	Late Report			36.0	36.3	39.6
4th of July Summit	16B 3	3100	4/1	0	0.0	13.1	1.3	11.2
Kellogg Peak 1/	16B 5A	5560	4/2	44	13.4	30.9	34.2	31.2
#Lookout	15B 2	5250	4/1	79	24.1	42.8	37.3	39.0
Lower Sands Creek	16B 1	3400	3/29	22	8.6	22.7	18.3	21.4*
Mosquito Ridge 1/	16A 4A	5110	4/2	82	25.0	41.8	39.8	38.3
Outlaw	15B 12	3750	Late Report			18.2	11.4	--
Roland Summit 1/	15B 5A	5200	4/2	61	18.6	39.5	38.4	38.5
Sherwin	16C 1	3200	3/30	10	3.6	16.6	12.6	15.2
Sunset 1/	15B 9A	5600	4/2	78	23.8	35.6	33.8	31.9
SANPOIL RIVER								
Sherman Creek Pass	18A 1	5350	3/29	40	7.0	15.2	18.4	14.8
OKANOGAN RIVER								
Aberdeen Lake	Canada	4300	3/29	8	2.2	8.1	5.8	6.8
Blackwall Mountain	Canada	6250	4/2	78	22.2	20.5	37.7	--
Bouleau Creek	Canada	5000	3/26	24	5.6	13.7	11.2	12.2**
Brookmere	Canada	3200	3/30	11	4.7	7.9	7.2	9.9**
Copper Mountain	Canada	4300	3/29	0	0.0	4.6	4.4	6.4**
Clark 1/	19A 8a	7000	Not Measured			New Course		
#Freezeout Meadows	20A 2	5000	3/27	41	16.1	22.3	30.7	36.0*
Hamilton Hill	Canada	4900	3/31	29	10.0	14.5	16.1	--
#Harts Pass	20A 5	6500	3/24	90	33.4	35.5	48.5	48.2*
#Horseshoe Basin 1/	19A 5a	7000	3/31	33	11.6	6.4	9.5	--
Lost Horse Mountain	Canada	6300	4/2	25	6.0	9.6	6.7	--
#Loup Loup	19A 7	4650	3/29	9	2.2	6.0	11.1	--
McCulloch	Canada	4200	3/31	13	3.4	9.3	4.4	7.2
Missezula Mountain	Canada	5100	4/2	19	5.4	7.3	7.0	--
Mission Creek	Canada	6000	3/29	52	14.7	20.9	18.7	20.8
Monashee Pass	Canada	4500	3/28	37	11.5	15.7	14.5	13.3**
Muckamuck	19A 9a	6390	Not Measured			New Course		

1/ Snow water equivalent estimated from aerial stadia observations
\# Not directly on this drainage
* Adjusted 1943-57 average
** Average for years of record

APPENDIX 5

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT 1963 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1962	1961	1943-57 Avg.
OKANOGAN RIVER (Cont'd)								
Mutton Creek No. 1	19A 1	5700	3/28	19	5.5	6.0	11.8	14.6
Mutton Creek No. 2	19A 4	6000	3/28	34	8.5	9.8	14.2	15.4*
New Copper Mountain	Canada	4300	3/30	0	0.0	3.8	5.8	--
Nickel Plate Mtn.	Canada	6200	3/31	18	4.8	10.3	7.7	7.3**
Paysayten 1/	20A 28a	4300	3/31	42	14.7	6.1	14.4	--
Penticton Reservoir	Canada	5300	3/28	23	4.5	--	8.9	8.6**
Postill Lake	Canada	4500	3/28	21	4.3	10.2	7.7	9.1**
#Quartette Lake	Canada	4000	3/30	32	9.8	9.8	15.3	15.6**
Rusty Creek	19A 3	4000	3/30	9	2.0	5.6	8.9	7.3*
Salmon Meadows	19A 2	4500	3/28	17	5.2	7.6	9.8	11.1
Silver Star Mtn.	Canada	6050	3/28	57	17.5	18.5	17.8	--
Starvation Mtn. 1/	19A 10a	6750	Not Measured			New Course		
Summerland Reservoir	Canada	4200	3/30	20	4.4	8.8	8.4	9.2
Touts Coulee	19A 6	2845	3/28	0	0.0	0.0	0.0	--
Trout Creek	Canada	4700	3/31	15	3.8	7.5	5.5	8.0
White Rocks Mtn.	Canada	6000	4/1	50	13.2	19.7	20.2	18.2**
METHOW RIVER								
Billy Goat Pass 1/	20A 10a	6400	3/31	93	32.6	13.4	33.4	--
#Dagger Lake	20A 17	5200	3/25	105	30.3	35.4	43.5	46.6
Dollar Watch 1/	20A 29a	7000	3/31	78	27.3	11.5	23.9	--
Harts Pass	20A 5A	6500	3/24	90	33.4	35.5	48.5	48.2*
Horseshoe Basin 1/	19A 5a	7000	3/31	33	11.6	6.4	9.5	--
Loup Loup	19A 7	4650	3/29	9	2.2	6.0	11.1	--
#Mutton Creek No. 1	19A 1	5700	3/28	19	5.5	6.0	11.8	14.6
#Mutton Creek No. 2	19A 4	6000	3/28	34	8.5	9.8	14.2	15.4*
#Rusty Creek	19A 3	4000	3/30	9	2.0	5.6	8.9	7.3*
#Salmon Meadows	19A 2	4500	3/28	17	5.2	7.6	9.8	11.1
CHELAN LAKE BASIN								
Agnes Creek	20A 21	5400	3/24	119	33.1	43.6	56.7	58.1
Bridge Creek	20A 15	2100	3/24	40	10.0	18.5	22.8	27.1
Bullion	20A 18	1460	3/29	0	0.0	6.6	6.1	13.2
Cloudy Pass	20A 22A	6500	3/24	125	31.8	34.7	53.9	51.6
Cottonwood	20A 11	2500	3/28	81	19.7	31.3	42.3	39.9
Dagger Lake	20A 17	5200	3/25	105	30.3	35.4	43.5	46.6
Greenwood Flat	20A 25A	3540	3/24	38	10.1	13.5	25.7	26.2

1/ Snow water equivalent estimated from aerial stadia observations
\# Not directly on this drainage
* Adjusted 1943-57 average
** Average for years of record

APPENDIX 6

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT 1963 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1962	1961	1943-57 Avg.
CHELAN LAKE BASIN (Cont'd)								
Little Meadows	20A 24A	5275	3/24	74	21.7	31.7	47.2	46.3
Lyman Lake	20A 23A	5900	3/24	128	33.6	40.6	60.8	61.3
Park Creek Flat	20A 13A	2220	3/28	64	17.7	23.3	35.8	35.4
Park Creek Ridge	20A 12A	4600	3/28	87	25.3	36.0	50.7	48.0
Pass Creek	20A 19	2500	3/29	49	13.3	23.7	29.2	33.3
Petersons 1/	20A 16a	3730	Not Measured			26.2	33.3	31.5
Rainy Pass	20A 9	4780	3/25	89	25.5	32.9	43.7	42.5
Safety Harbor	20A 30	6000	3/31	70	18.7	New Course		
Seven Mile	20A 26	3015	3/30	22	8.5	14.0	21.7	22.9
Two Mile	20A 27	2020	3/30	0	0.0	4.3	3.9	11.3
ENTIAT RIVER								
Brief	20B 19	1600	3/29	0	0.0	0.0	0.0	--
WENATCHEE RIVER								
Berne-Mill Creek	21B 23	2925	3/27	13	2.1	24.3	25.3	--
Blewett Pass No. 2	20B 2	4270	3/29	7	1.4	15.7	14.2	18.8*
Chiwaukum G. S.	20B 16	1810	3/27	0	0.0	9.0	9.6	--
#Fish Lake	21B 4	3371	3/27	34	12.5	33.2	35.2	38.7
Lake Wenatchee	20B 5	1970	3/27	0	0.0	10.3	9.5	--
Leavenworth R. S.	20B 17	1127	3/27	0	0.0	0.0	0.0	--
#Lyman Lake	20A 23A	5900	3/24	128	33.6	40.6	60.8	61.3
Merritt	20B 18	2140	3/27	0	0.0	10.6	14.8	--
Stevens Pass	21B 1	4070	3/27	63	26.2	47.0	56.3	54.3*
SQUILCHUCK CREEK								
Beehive Springs	20B 3	4400	3/25	0	0.0	8.3	6.6	9.0*
Scout-A-Vista	20B 4	3400	3/25	0	0.0	7.7	4.8	7.6*
STEMILT CREEK								
Jump-Off	20B 8	4450	3/25	0	0.0	7.6	7.8	--
Stemilt Slide	20B 6	5000	3/25	0	0.0	12.5	16.0	--
Upper Wheeler	20B 7	4400	3/25	0	0.0	10.3	7.9	--

\# Not directly on this drainage
* Adjusted 1943-57 average

APPENDIX 7

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT 1963 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1962	1961	1943-57 Avg.
YAKIMA RIVER								
Ahtanum R. S.	21C 11	3100	3/30	8	3.0	6.7	0.0	6.4*
Big Boulder Creek	21B 9	3200	3/27	1	0.7	13.6	16.9	23.4
#Blewett Pass No. 2	20B 2	4270	3/29	7	1.4	15.7	14.2	18.8*
Bumping Lake	21C 8	3450	3/28	10	3.4	13.4	15.1	19.4
#Cayuse Pass	21C 6	5300	4/2	148	54.2	78.0	108.8	97.5
Clockum Pass	20B 9	5370	4/2	30	9.6	16.4	24.4	--
Cooke Creek	20B 10	4123	3/28	0	0.0	7.2	6.2	--
#Corral Pass	21B 13	6000	3/28	68	22.1	38.7	44.5	47.3*
Fish Lake	21B 4	3371	3/27	34	12.5	33.2	35.2	38.7
Green Lake	21C 10	6000	3/29	81	23.5	37.2	44.5	30.9*
Grouse Camp	20B 11	5385	4/2	22	6.9	15.0	23.1	--
High Creek	20B 12	2930	4/2	0	0.0	0.0	0.0	--
Lake Cle Elum	21B 14M	2200	3/28	0	0.0	0.0	2.5	9.4
Manashtash	20C 1	3935	4/2	0	0.0	0.0	0.0	--
Morse Lake	21C 17	5400	3/28	97	32.6	51.0	65.0	65.6*
Namum	20B 13	3875	4/2	0	0.0	10.0	9.6	--
#Olallie Meadows	21B 2	3625	3/29	53	14.7	41.3	46.0	58.6*
#Satus Pass	20D 1	4030	3/27	1	0.2	11.1	1.8	--
#Stampede Pass	21B 10	3000	4/2	75	25.1	38.1	46.5	53.8*
Trail Creek	20B 14	3360	3/28	0	0.0	0.0	0.0	--
Tunnel Avenue	21B 8	2450	3/28	7	3.6	22.7	31.6	29.1
Walters Flat	20B 15	3360	4/2	0	0.0	6.2	5.9	--
White Pass	21C 9	4500	4/3	56	18.0	30.4	34.9	39.1*
White Pass (Ea. Side)	21C 28	4500	3/28	31	9.7	21.7	28.0	38.5*
White Pass(Leach Lk.)	21C 27	4500	4/3	48	15.2	26.4	29.0	--
AHTANUM CREEK								
Ahtanum R. S.	21C 11	3100	3/30	8	3.0	6.7	0.0	6.4*
Green Lake	21C 10	6000	3/29	81	23.5	37.2	44.5	30.9*
LOWER COLUMBIA DRAINAGE								
MILL CREEK								
Homestead	17C 1	4030	3/27	0	0.0	9.2	2.4	--
Martin Springs	17C 2	4400	3/27	12	4.2	17.2	11.8	--
Walla Walla Div.	18D 13	2400	3/27	0	0.0	0.0	0.0	--

\# Not directly on this drainage
* Adjusted 1943-57 average

APPENDIX 8

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT 1963 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1962	1961	1943-57 Avg.
KLICKITAT RIVER								
Satus Pass	20D 1	4030	3/27	1	0.2	11.1	1.8	--
West Fork Cabin	21C 15	3000	3/27	0	0.0	9.3	10.0	--
WHITE SALMON RIVER								
Cultus Creek	21C 12	4000	4/2	77	23.8	47.6	51.5	53.6*
#Surprise Lakes	21C 13	4250	4/2	78	22.9	52.0	56.7	58.8*
WIND RIVER								
Oldman Pass	21D 19	3100	4/2	31	6.6	15.9	14.4	20.0*
LEWIS RIVER								
Blue Lake 1/	21C 22a	4800	4/2	138	44.1	78.0	100.0	--
Bob's Trail	21C 21	2200	3/28	0	0.0	11.4	9.4	--
Calamity Ridge 1/	22D 1a	2500	4/2	8	1.6	0.0	0.0	--
Council Pass 1/	21C 18a	4200	4/2	59	17.7	38.5	40.2	--
#Cultus Creek	21C 12	4000	4/2	77	23.8	47.6	51.5	53.6*
Divide Meadow 1/	21C 29a	5600	4/2	108	34.6	56.1	75.5	--
Grand Meadow	21C 25	3500	3/28	19	7.1	25.1	28.6	--
Lone Pine Shelter	21C 26	3800	3/28	33	11.3	34.2	44.3	--
Marble Mountain	22C 5a	3200	4/2	37	9.5	New Course		
Mosquito Meadows	21C 19	4100	Late Report			41.4	44.7	49.3*
Muddy River	22C 3	1400	3/27	0	0.0	4.9	0.0	--
Oldman Pass	21D 19	3100	4/2	31	6.6	15.9	14.4	20.0*
Plains of Abraham 1/	22C 1A	4400	4/2	112	34.7	65.4	81.7	76.5*
Smith Creek Road	22C 4	2100	4/2	0	0.0	15.8	12.8	--
Spencer Meadow	21C 20a	3400	4/2	36	7.4	19.9	14.7	--
Surprise Lakes	21C 13A	4250	4/2	78	22.9	52.0	56.7	58.8*
Table Mountain 1/	21C 24a	4200	4/2	78	23.4	50.5	42.1	--
Timbered Peak 1/	21D 18a	3000	4/2	36	7.4	7.2	--	--
COWLITZ RIVER								
Cayuse Pass	21C 6	5300	4/2	148	54.2	78.0	108.8	97.5
Mosquito Meadows	21C 19	4100	Late Report			41.4	44.7	49.3*
Ohanapecosh	21C 32	2200	4/3	7	2.5	New Course		
Packwood Lake	21C 31	2870	3/29	4	1.0	10.8	6.5	--
Plains of Abraham 1/	22C 1A	4400	4/2	112	34.7	65.4	81.7	76.5*

1/ Snow water equivalent estimated from aerial stadia observations
\# Not directly on this drainage
* Adjusted 1943-57 average

APPENDIX 9

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT 1963 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1962	1961	1943-57 Avg.
COWLITZ RIVER (Cont'd)								
Potato Hill	21C 14	4500	3/27	18	7.5	30.5	32.4	36.5*
#White Pass	21C 9	4500	4/3	56	18.0	30.4	34.9	39.1*
#White Pass(Ea. Side)	21C 28	4500	3/28	31	9.7	21.7	28.0	38.5*
#White Pass(Leach Lk)	21C 27	4500	4/3	48	15.2	26.4	29.0	--
Willame Creek	21C 30	3250	3/29	41	10.6	30.9	32.1	--
PUGET SOUND DRAINAGE								
NISQUALLY RIVER								
Ghost Forest	21C 4	4550	4/1	70	21.3	47.3	47.0	53.3*
Longmire	21C 3	2760	4/1	10	2.2	7.2	3.7	14.9*
Paradise Park	21C 2	5500	4/1	131	46.8	71.3	90.4	86.4*
Stem Glade	21C 1	5050	4/1	132	45.4	67.6	80.0	80.3*
WHITE RIVER								
#Cayuse Pass	21C 6	5300	4/2	148	54.2	78.0	108.8	97.5
Corral Pass	21C 13	6000	3/28	68	22.1	38.7	44.5	47.3*
#Morse Lake	21C 17	5400	3/28	97	32.6	51.0	65.0	65.6*
White R. Entrance	21C 5	3600	4/2	31	6.1	12.8	16.6	23.2
White R. Entr. New	21C 16	3400	4/2	20	3.5	5.3	3.4	11.8*
GREEN RIVER								
Airstrip	21B 24	1800	4/2	0	0.0	0.0	0.0	--
Charley Creek	21B 25	1200	4/2	0	0.0	0.0	0.0	--
Grass Mtn. No. 1	21B 26	4000	4/2	32	9.2	23.7	10.1	--
Grass Mtn. No. 2	21B 27	2900	4/2	28	6.0	21.0	17.1	--
Grass Mtn. No. 3	21B 28	2100	4/2	10	1.0	4.0	0.0	--
Lester Creek	21B 29	3100	4/2	45	11.2	25.6	26.3	--
Sawmill Ridge	21B 31	4700	4/2	68	22.6	38.4	44.8	--
Stampede Pass	21B 10	3000	4/2	75	25.1	38.1	46.5	53.8*
Twin Camp	21B 30	4100	4/2	41	13.8	25.8	25.9	--

\# Not located directly on this drainage
* Adjusted 1943-57 average

APPENDIX 10

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT 1963 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1962	1961	1943-57 Avg.
CEDAR RIVER								
City Cabin	21B 3	2390	4/3	12	1.5	8.8	3.8	27.0*
Mt. Gardner	21B 21	3300	4/3	14	3.1	12.8	13.8	--
Mt. Gardner Aux.	21B 22	2500	Not Measured			0.0	0.0	--
Mt. Lindsay	21B 16	2500	4/4	17	4.4	12.9	8.4	25.8*
Mt. Washington	21B 15	3000	4/2	15	1.6	6.6	0.0	9.6*
Rex River	21B 17	2400	4/4	8	3.0	9.4	9.0	33.3*
South Fork Cedar	21B 6	3000	4/3	11	2.5	14.2	15.5	30.7*
Tinkham Creek	21B 20	3400	4/3	18	3.9	13.4	12.1	--
SNOQUALMIE RIVER								
#Lake Elizabeth	21B 19	2900	4/1	50	14.4	47.3	30.1	--
Olallie Meadows	21B 2	3625	3/29	53	14.7	41.3	46.0	58.6*
South Fork Tolt	21B 18	1900	4/2	5	1.6	0.0	0.0	--
SKYKOMISH RIVER								
Lake Elizabeth	21B 19	2900	4/1	50	14.4	47.3	30.1	--
#Stevens Pass	21B 1	4070	3/27	63	26.2	47.0	56.3	54.3*
SKAGIT RIVER								
Beaver Creek Trail	21A 4	2200	3/27	0	0.0	7.3	6.9	16.3*
Beaver Pass	21A 1	3680	3/27	31	12.2	22.6	33.8	38.8*
#Cloudy Pass	20A 22A	6500	3/24	125	31.8	34.7	53.9	51.6*
Devils Park	20A 4	5900	3/27	83	31.8	37.2	50.5	45.6*
Freezeout Cr. Trail	20A 1	3500	3/27	9	3.4	6.7	11.7	15.5*
Freezeout Meadows	20A 2	5000	3/27	41	16.1	22.3	30.7	36.0*
#Harts Pass	20A 5A	6500	3/24	90	33.4	35.5	48.5	48.2*
Klesilkwa	Canada	3700	3/27	4	1.6	6.4	8.8	16.4**
Lake Hozomeen	21A 2	2600	3/28	1	0.6	5.6	4.4	13.6*
#Lyman Lake	20A 23A	5900	3/24	128	33.6	40.6	60.8	61.3
Meadow Cabins	20A 8	1900	3/31	0	0.0	3.8	3.1	8.5*
New Tashme	Canada	2500	3/31	2	0.5	6.1	2.8	11.4**
Quartette Lake	Canada	4000	3/30	32	9.8	9.8	15.3	15.6**
#Rainy Pass	20A 9	4780	3/25	89	25.5	32.9	43.7	42.5
Thunder Basin	20A 7	4200	3/31	43	12.9	18.7	28.2	28.3*

\# Not directly on this drainage
* Adjusted 1943-57 average
** Average for years of record

APPENDIX 11

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT 1963 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1962	1961	1943-57 Avg.
BAKER RIVER								
Dock Butte	21A 11A	3800	4/1	102	42.0	63.0	68.4	--
Easy Pass	21A 7A	5200	4/1	164	68.7	80.2	95.1	--
Jasper Pass	21A 6A	5400	3/31	180	67.3	75.7	100.9	--
Koma Kulshan	21A 17	800	4/1	0	0.0	3.1	0.0	--
Marten Lake	21A 9A	3600	4/1	124	47.5	62.8	72.5	--
#Panorama	21A 5	4300	4/2	138	58.0	66.8	86.0	--
Rocky Creek	21A 12A	2100	4/1	22	5.3	19.5	15.9	--
Schreibers Meadow	21A 10A	3400	4/1	96	38.4	55.6	63.6	--
S.F. Thunder Creek	21A 14A	2200	4/1	4	0.9	1.8	0.0	--
Sulphur Creek	21A 13	1600	4/1	4	1.0	10.4	5.8	--
Three Mile Creek	21A 15	1600	4/1	0	0.0	0.0	0.0	--
Watson Lakes	21A 8A	4500	4/1	95	40.0	58.7	78.2	--
NOOKSACK RIVER								
Panorama	21A 5	4300	4/2	138	58.0	66.8	86.0	--
OLYMPIC PENINSULA								
DUNGENESS RIVER								
Deer Park	23B 4	5200	Late Report			18.7	25.9	31.2*
ELWHA RIVER								
Hurricane	23B 3	4500	Late Report			21.6	26.6	35.9*
SKOKOMISH RIVER								
Black & White	23B 7	4200	4/2	61	16.1	35.2	47.5	59.0*
Black & White Lakes	23B 6	4700	4/2	79	27.1	53.6	76.0	77.6*
Home Sweet Home	23B 5	5200	4/2	134	48.1	61.2	91.8	94.6*
Sundown Pass	23B 8	3900	4/2	62	17.9	43.7	69.1	--

\# Not located directly on this drainage
* Adjusted 1943-57 average

Agencies Assisting with Snow Surveys

GOVERNMENT AGENCIES

Canada:

Department of Lands, Forests and Water Resources,
Water Resources Service, British Columbia

States:

Washington State Department of Conservation
Washington State Department of Natural Resources

Federal:

Department of the Army
  Corps of Engineers
U. S. Department of Agriculture
  Forest Service
U. S. Department of Commerce
  Weather Bureau
U. S. Department of the Interior
  Bonneville Power Administration
  Bureau of Reclamation
  Geological Survey
  National Park Service

PUBLIC AND PRIVATE UTILITIES

Chelan County P.U.D.
Pacific Power and Light Company
Puget Sound Power and Light Company
Washington Water Power Company

OTHER PUBLIC AGENCIES

Okanogan Irrigation District

MUNICIPALITIES

City of Walla Walla
City of Tacoma
City of Seattle

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.

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